

The applicant filed a Voluntary Amendment dated November 4, 1999. The Applicant requests that the amendments to the claims 1, 9, 10 and 11 which are set out in the Voluntary Amendment be entered at this time. The amendments set out in this Response are based on the claims as amended by the November 4, 1999 Voluntary Amendment.

The Examiner required restriction to one of the following inventions under 35 U.S.C. Section 121:

- 1) claims 1-12, drawn to a domestic method of treating a liquid comprising water
- 2) claims 13-25 drawn to a domestic apparatus for treating liquid comprising water.

The applicant hereby confirms the provisional election made in a telephone conversation with the Examiner on November 1999 to restrict the application to the invention described in claims 1 to 12, without prejudice. Accordingly, claims 13-25 have been cancelled without prejudice.

The Examiner noted that the applicant has not filed a certified copy of the application filed in Canada on November 9, 1998, which is the basis of the applicant's claim for foreign priority. The applicant will arrange to file the appropriate documentation.

The Examiner objected to the drawings which included a reference not mentioned in the description, namely 42. The applicant has amended the specification to ensure that tube 42 is properly referenced in the specification.

The Examiner objected to the language of the abstract. The applicant has deleted the last line of the paragraph and removed legal phraseology used in patent claims. Accordingly, it is respectfully submitted that the abstract is in acceptable format.

The Examiner objected to claims 10 and 11 as the limitation "the off gas" did not have sufficient antecedent basis. The applicant has amended the claims 10 and 11 to provide the requisite antecedent. The applicant submits that these changes merely clarify the claims as originally filed and are not directed to distinguish over any of the art.

The Examiner rejected claims 1 to 3, 6 and 7 as being unpatentable over Nelson et al. The Examiner stated that Nelson et al. contains all the

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limitations of the claims except that the method is domestic. As stated by the Examiner at page 5 of the Office Action, "since the produced water is of ultrapure quality, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the system of Nelson et al. to use it in a domestic setting because of its simplicity and ability to entrain a high level of ozone in the water".

The applicant has carefully considered the rejection raised by the Examiner and respectfully submits that, the claims as amended herein, are patentable over Nelson et al. In particular, the applicant respectfully submits that the suggestion raised by the Examiner is in fact contrary to the teaching of Nelson et al. Nelson et al. is directed towards industrial use of ozonated water. In particular, as stated in Nelson et al. at column 4, lines 30 - 34:

"...ozonated water prepared with the method and/or system of the present invention is effective to clean, i.e., oxidize and/or remove organic contaminants and/or photoresist materials, from surfaces such as in-process silicon wafers."

The ozonated water produced by Nelson et al. is desirable for such uses because it contains an enhanced level of ozone. In particular, as stated by Nelson at column 3, lines 5 - 11:

"More specifically, it is an object of the present invention to provide a method and system for increasing the quantity of dissolved ozone in an aqueous solution, and furthermore, for maintaining the dissolved ozone in solution when delivered to a point of use. In this manner, the present invention provides an exceptionally efficient method and system for producing and using high concentration ozonated water." (emphasis added)

Therefore, it can be seen that the purpose of Nelson et al. is, in particular, to maintain the dissolved ozone in the water such that "the dispensed admixture comprises an increased quantity of dissolved gas relative to admixture produced and dispensed by conventional methods" (column 4, lines 49 - 51).

The applicant notes that Nelson has a pressurized liquid outlet conduit (6) in flow communication with outlet (40) through which the ozonated water is dispensed.

Claim 1 has been amended to specify that the method includes utilizing the increased pressure in the treatment vessel to dispense the treated

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liquid from the treatment vessel through a carbon filter which is located downstream from the treatment vessel. If the carbon filter were positioned in pressurized liquid outlet conduit (6) of Nelson et al., the concentration of ozone in the ultrapure water would be reduced. Accordingly, inserting a filter through which the treated water of Nelson et al. passes would result in removing ozone from the water and is contrary to the specific teaching of Nelson et al. Again, the applicant points out that Nelson states that it is an object of the invention of Nelson et al. for "maintaining the dissolved ozone in solution" (column 3, line 8).

In addition to the foregoing, the applicant further points out that there is no teaching or even any suggestion in Nelson et al. that the pressure developed in pressurized vessel (2) could be sufficient to drive the treated water through a carbon filter so as to remove the ozone from the water.

If water is to be used for drinking purposes in a home, the dispensed water should not contain a substantial amount of ozone. Therefore, the water is passed through a carbon filter so as to remove carbon from the water. In particular, carbon acts as a catalyst to destruct ozone. The applicant submits that even if a person skilled in the art would combine Nelson and Olsen as suggested by the Examiner, they would not merely place a filter downstream from outlet (6) of Nelson et al. Instead, they would use a pump for passing the water through a filter prior to dispensing the water to a consumer.

Olsen is provided with a dispensing pump 92 for conveying treated water to water exit pipe 100 and thence to post treatment filter 104. Post treatment filter 104 is stated as comprising a filter media known in the art of water filtering. The water subsequently exits the apparatus through water spigot 106 (column 6, lines 23 - 48 of Olsen).

The applicant submits that Olsen represents the state-of-the-art for a person skilled in the art. Therefore, if a person skilled in the art were to consider altering Nelson et al. for providing drinking water, they would insert a pump and a post-filter and would not consider relying upon the pressurization in the ozonation chamber for passing the treated water through a post-filter. In view of the foregoing, the applicant respectfully submits that claim 1, and the claims dependant thereon, are patentable over Nelson et al.

The applicant has amended claim 7 to specify that the process comprises a batch process. Nelson exemplifies the use of pressurized ozonation in

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an industrial setting which is operating at steady state conditions (see column 5, lines 52 - 55 where the term "continuous process" is defined in Nelson et al.). Claim 7, as well as new claim 27, are directed towards a batch process. In such a process, the treatment vessel has to be pressurized and then the pressure is subsequently used for dispensing the treated water through a filter. The applicant respectfully submits that if a person skilled in the art were to amend the process of Nelson et al., that they would not convert Nelson et al. to a batch operated process. In particular, when ozone water treatment units are operated as a batch process for domestic use, they would incorporate a water pump and post-filter as taught by Olsen.

The Examiner rejected claim 5 under 35 U.S.C.103(a) as being unpatentable over Nelson et al. in view of Olsen and further in view of Capehart. The Examiner stated that Capehart discloses directing vented off gas from the vessel to a downstream filter.

The applicant has carefully considered the rejection raised by the Examiner. The applicant has noted that in the portion relied upon by the Examiner, namely column 10, lines 24 - 29 of Capehart, this reference teaches that the "ozone off-gas 402 contacts with the water from the cartridge filters 38 and flows along with the water into a second granular activated carbon filter 40" (emphasis added). Accordingly, Capehart introduces the ozone into the water prior to the water and ozone mixture contact second granular activated carbon filter 40.

The purpose of the instant application is to obtain water for use domestically (eg. drinking water). For such cases, it is important to ensure that the water is not recontaminated. Carbon filters can be a source of contamination (even if they are a post filter). Therefore, according to the step of claim 5, off-gas containing ozone is passed through the filter to treat the filter prior to water contacting the filter. The applicant has amended claim 5 to specify that the gas is vented and passed through the filter "prior to dispensing water from the treatment vessel". Applicant has clarified the meaning of this claim, to conform with the specification, in view of the rejection raised by the Examiner. In the process of Capehart, the water and ozone are contacted with the filter at the same time. The instant process is advantageous as it permits the off-gas to be utilized to treat the filter prior to the water contacting the filter. This modification of the process is not in any way taught or suggested by the references relied upon by the Examiner.

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The Examiner rejected claims 4, 8, 9 and 12 as being unpatentable over Nelson et al. in view of Olsen. The Examiner stated that Olsen discloses a domestic system using a treatment vessel to bubble ozone into water, venting ozone gas from the vessel, using a post-filter downstream from the vessel, detecting the level of ozone treatment based on treatment time and signalling the user while preventing operation of the system.

The applicant has amended claim 1 by inserting therein the limitation of claim 4. The applicant notes that the Examiner has argued that it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the system of Nelson et al. to include filtering the treated water in order to provide additional treatment to remove particles entrained in the water that cannot be removed by gas treatment. However, the applicant repeats and relies upon its arguments set out above. In particular, the state-of-the-art as presented by Olsen et al. (which is relied upon by the Examiner) demonstrates the use of a pump 92 to pass water through a suitable filter 104 prior to dispensing the water through spigot 106. There is no teaching or suggestion anywhere which has been relied upon by the Examiner to demonstrate that the water pressure in a treatment vessel would be sufficient to pass the treated water through filter 104 of Olsen. The applicant notes that the use of pressurized treatment vessels is not novel in industry. Therefore, at the time of Olsen, one skilled in the art could have designed Olsen to operate on pressure developed during the treatment of the water with ozone. However, none of the references which has been relied upon by the Examiner, nor any reference which has been located by the applicant, disclose or in any way suggest that it would be possible to operate a domestic water treatment apparatus, and, as specified in claim 7, a batch process, in the method suggested by the Examiner.

The applicant respectfully submits that the references cannot be combined as suggested by the Examiner since there is not teaching to combine the references as suggested by the Examiner. In fact, Nelson et al. teaches against placing a filter downstream from pressurized liquid outlet (6). Further, Olsen, as representing the state-of-the-art relied upon by the Examiner, teaches to use a water pump instead of pressure to pass treated water through a post-filter.

The Examiner stated that Olsen teaches "preventing operation of the system". The applicant's system operates by monitoring the treatment of the liquid and preventing the liquid from being dispensed from the treatment vessel if a pre-determined level of treatment is not achieved. The applicant has clarified claim 12 to specify that the user subsequently manually empties the treatment vessel if the requisite level of treatment

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is not achieved. In particular, the applicant's apparatus includes a light (30) to advise the user to manually empty container (2).

The applicant has reviewed Olsen and noted that Olsen includes a treated water ozone sensor 88 which is used to determine the level of ozone in solution in treated water held in treated water storage tank 80. Microcontroller 14 receives a signal from treated water ozone sensor 88 when the ozone in solution drops below a certain predetermined level. The signal from ozone sensor 88 indicates water in treated water storage tank 80 is in need of retreatment. (emphasis added). Accordingly, the process of Nelson et al. teaches that the water is recirculated through the system for further treatment prior to being dispensed. (see column 8, lines 40 - 53). Olsen does not state that the water is prevented from being dispensed and a user is signalled to manually empty the treatment chamber. Further, the recirculation utilized by Olsen et al. teaches contrary to the method of the instant invention whereby a user manually empties the treatment vessel. In view of the foregoing, it is respectfully submitted that claim 12 is patentable over Nelson in view of Olsen.

The applicant has also carefully considered the rejection of claim 9. In particular, the applicant has reviewed the section of Olsen referred to by the Examiner in paragraph 14 of the Office Action. In the applicant's review of Olsen, the applicant cannot locate any teaching by Olsen of the subject matter in claim 9. In particular, the applicant notes that Olsen does utilize a plurality of diagnostic lights 126 to indicate the status such as disinfection cycle engaged, purified water available, system check and change air dryer (column 7, lines 20 - 23). However, Olsen utilizes two chambers, namely a treatment chamber and a treated water storage tank 80. Sensor 88 is used to monitor the level of ozone in the treated water. As noted above, Olsen uses a recirculation system to transfer the treated water to the treatment chamber. Olsen does not signal a user if a predetermined level of treatment is not achieved in a pre-determined time such that the user than manually empties a treatment vessel.

In view of the foregoing, the applicant respectfully submits that the claims are allowable over Nelson in view of Olsen.

The Examiner rejected claims 10 and 11 as being unpatentable over Nelson et al. in view of Olsen and further in view of Pearson. The Examiner stated that Pearson discloses the method for disinfecting water comprising adding ozone to the water in a treatment vessel, filtering the water downstream, detecting ozone concentration in vented off gas, sounding an alarm if the concentration exceeds a predetermined level at

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one stage, and sending electric signals to increase ozonation if the concentration in the off gases below is an excess level.

The applicant repeats and relies upon its arguments set out herein in support of its position that claims 10 and 11 are patentable over the references cited by the Examiner. The Pearson process and apparatus is designed for use in the treatment of infectious waste as shown in the title. It is not designed for a domestic water purification system suitable for providing purified drinking water. It would not be obvious to someone skilled in the art of purifying drinking water to apply Nelson, an industrial ultra-purification process with Olsen, a domestic process and Pearson, a medical waste treatment process to obtain the invention described in Claims 10 and 11.

The Examiner stated in page 16 of the Office Action that it would have been obvious to one having ordinary skill in the art at the time of the invention to have used off gas detection to monitor the process. The applicant points out that the references relied upon by the Examiner, such as Pearson and Olsen, utilize water based ozone sensors. In particular, the sensor of Olsen operates based upon a CT basis. The water is treated to first obtain a pre-determined level of ozone in the water and the water is then treated for a set time. The process of the instant invention utilizes sensing the concentration of ozone in the off gas and not the level of ozone in the water. These are a completely different basis of control and, it is respectfully submitted, that it would not be obvious to a person skilled in the art that off gas sensing can be used to control a water treatment process.

The applicant has added new claims 26 - 38. New claim 26 depends from claim 11 and includes the step of passing the off-gas through the filter to treat the filter prior to dispensing water from the treatment vessel.

Claim 28 is an independent claim. Claim 28 is an independent claim and specifies that the process is a batch process. The applicant has introduced into step (d) of claim 28 language to clarify that the process is in fact a batch process. The claim specifies that the increased pressure is utilized to remove the treated liquid from the treatment vessel if a predetermined level of treatment is achieved. The applicant repeats and relies upon the arguments set out above that claim 28, as well as the claims dependant thereon, are patentable over the prior art cited by the Examiner.

The applicant has also inserted new independent claim 34. Claim 34 specifies that a user is signalled if a predetermined level of treatment is

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not achieved. Further, when combined with claim 35, the claim specifies that the water is not dispensed by utilizing the increased pressure in the treatment vessel if the water has not been treated to a predetermined level of treatment. The applicant repeats and relies upon the arguments set out above that claim 34 and the claims dependant thereon are patentable over the prior art relied upon by the Examiner.

In view of the foregoing, the applicant respectfully submits that the application is now in condition for allowance. Should the Examiner have any conditional concerns regarding language of the claims, the Examiner is respectfully requested to contact the undersigned at (416) 957-1695.

Respectfully submitted,

By: _____

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